Advanced Insulation Materials for Cryogenic Propellant Storage Applications, Phase II

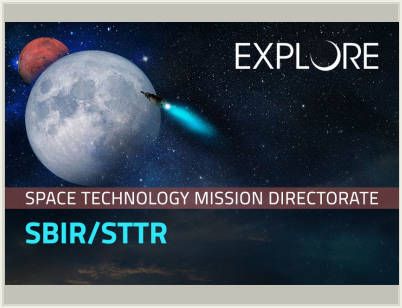
Completed Technology Project (2009 - 2012)

Project Introduction

Advanced Materials Technology, Inc responds to the NASA solicitation Topic X9 entitled "Propulsion and Propellant Storage" under subtopic X9-01, "Long Term Cryogenic Propellant Storage, Management, and Acquisition". The proposed Phase II program will focus on developing new multifunctional insulation materials that will impact cryogenic systems for space transportation orbit transfer vehicles, space power systems, spaceports, spacesuits, lunar habitation systems, robotics, and in situ propellan

Anticipated Benefits

With their ability to remain flexible and resilient from as low as ?400 F to as high as +600 F, novel foams offer the ideal choice for lightweight insulation in space applications. One such application is cryogenic insulation for fuel tanks on major rocket propulsion systems. Another is thermal insulation on the louvers of communications satellites where intermittent exposure to sun and darkness requires the novel foam's operating temperature range. The technology proposed in this program will help NASA to reduce the cost of space flight. Our materials will provide NASA with robust cryogenic solutions and, therefore, will significantly decrease space mission failures. Other NASA applications include space shuttle program where the new foams can provide lightweight, fire resistant cushioning for medical supplies and critical instruments. The technology developed under this program can benefit aerospace, marine, aircraft, electronic, electrical, rail, automotive, building materials, and construction industries, as it offers unique combination of insulation, fire protection, and structural support capabilities. The new organic-inorganic hybrid foams can be used as thermal and acoustical insulation on marine vessels. These foams can be shaped for easy installation as pipe covering. Reinforced aluminized polyester/aluminum foil vapor barrier and/or ceramic glass cloths can be easily laminated to the novel foams. The new foams are specifically suited for the needs of the aircraft industry. These high performance foams will provide weight savings, improved handling/installation characteristics and enhanced performance durability in service compared to traditional insulation, resulting in lower operating and life cycle costs. In addition, the foams meet flammability, smoke, and toxicity requirements of aircrafts. The f



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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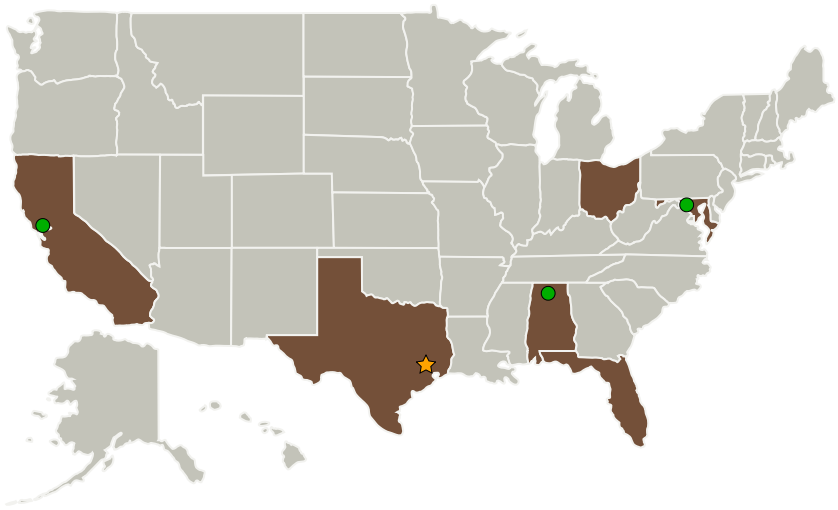
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Advanced Materials Technology, Inc.	Supporting Organization	Industry	Tampa, Florida
●Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
●Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
●Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	California

Continued on following page.

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Project Manager:
Gary C Jahns

Principal Investigator:
Akbar G Fard

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.1 In-space Propellant Storage & Utilization

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Primary U.S. Work Locations *(cont.)*	
Florida	Maryland
Ohio	Texas

Project Transitions

September 2009: Project Start

March 2012: Closed out